

Call 12 specifications of MID

October 2023



More info at https://www.xfel.eu/users/beamtime/call_for_proposals/index_eng.html

Photon beam parameters		Comments
Photon energy	7 – 18 keV	5 – 7 keV & 18 – 24 keV possible but need discussion
Pulse energy	1 mJ (SASE)	Depending on photon energy and self-seeding
Pulse duration	<100 fs	
Number of pulses per train	1 – ~600	352 pulses per train is the AGIPD storage limit
Repetition rate in pulse train	2.2 MHz	1.1 MHz and less also possible. 4.5 MHz upon special request
Train repetition rate	10 Hz	
Bandwidth	$\sim 10^{-3}$	1×10^{-4} or 6×10^{-5} by monochromator ; $\sim 10^{-4}$ by self-seeding
Beamsize on sample	10 – 2000 μm	Local optics nanofocusing $\sim 300 \times 300 \text{ nm}^2$ possible
Scattering geometries		
SAXS	3 – 8 m sample-detector distance	
WAXS	3 – 8 m, horizontal detector movement $2\theta = 15 - 50^\circ$	
Large field of view	~ 25 cm sample-detector distance, AGIPD sensor moved into sample chamber	
AGIPD detector		
Number of pixels	10^6	4 quadrants, central hole configuration
Pixel size	200 μm x 200 μm	
Noise	~ 1300 eV / ~ 950 eV	Normal / high CDS mode
Max frame rate	Single pulse resolved (4.5 MHz)	Up to 352 pulses stored from one train
Additional area detectors	ePix (2 x 500 k, 50 μm pixels, 10 Hz)	
X-ray diagnostics		
Intensity and position monitors	Scintillation detector, 10 Hz, transmissive	For slow mirror feedback stabilizing the beam position. MHz I_0 monitoring also possible using diamond detectors
Spectral monitor	0.4 eV resolution, 500 kHz rep rate	Bent diamond single crystal with Gotthard line detector

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Sample environments		
Sample holders on goniometer	Hexapods and Huber stages, piezo scanners, adapters implemented upon request	
Sample holder provided by users	Must be mountable on the hexapod. Experiments are possible either under vacuum conditions (windowless) or in air. Discussions with MID staff mandatory!	
Cryostat	He, down to ~10K. Contact MID staff!	
Optical laser system		
SASE2 PP laser		
Wavelength	800 nm (~1 mJ), 2 nd (400 nm) and 3 rd (266 nm) harmonics also available	A 1064nm/532nm ns laser is available upon request.
Pulse duration	>15 fs	
X-ray Split-Delay Line		
Energy range	~7 – 10 keV	
Delay range	-10 – 800 ps	
Bandwidth	~ 6 × 10 ⁻⁵ , 2 x 4 Si(220) reflections	
Small-angle MHz XPCS standard configuration		
AGIPD MHz area detector	1 Mpx, 200 μm pixel size	
Photon energy	7 – 12 keV, 1 mJ/pulse, up to 350 pulses/train	
Min. correlation lag time 440 ns	Max. lag time 155 μs	
Q-range (7.5 m sample-detector-distance)	~ 7e-3 – 0.1 Å ⁻¹	
Beam size on sample	1 – 10 μm with local optics, >=10 μm with tunnel optics	
Standard mounts for sample in capillaries and scanning		
Mounting of user-supplied sample environments possible (contact MID instrument group before proposal submission)		

All parameters are subject to change, depending on the commissioning and progress of accelerator and instrument.

It is mandatory to discuss your experiment with the MID group **before** submitting the proposal:
mid-info@xfel.eu

Further information can be found on the MID webpage:

https://www.xfel.eu/facility/instruments/mid/index_eng.html